

# PATENT ABSTRACTS OF JAPAN

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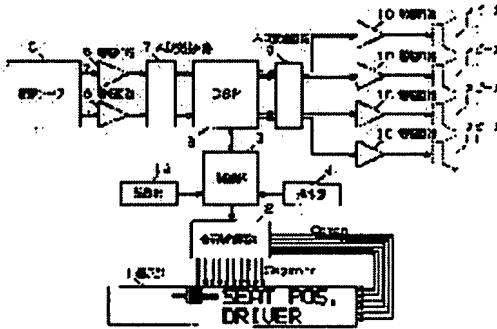
(22) Date of filing : 15.07.1996 (72) Inventor : YOSHIOKA KENJI

**(54) VEHICLE ACOUSTIC DEVICE**

(57) Abstract:

**PROBLEM TO BE SOLVED:** To display seat positions in a display device, when sound fields are set in each seat position in a vehicle.

**SOLUTION:** Each seat position in a vehicle is selected and display pattern data which corresponds to the selected seat position is shown in a display part 1 by an operational part 4, and also a signal level of a sound signal, that is outputted by speakers 11 which are arranged in the vehicle according to the seat position and delay time, are adjusted by a signal processing circuit 8. Thereby, the sound field can be set at a desired seat position, and the set seat position can easily be confirmed by the part 1.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] Two or more loudspeakers arranged at front and rear, right and left in a car, respectively, and a signal-processing means to output the signal which consisted of a multiplier, an adder, a delay machine, etc. and adjusted sound signal level and a time delay to the above-mentioned loudspeaker, respectively, A selection means to choose each sheet position in a car, and a storage means to memorize the display pattern data corresponding to each sheet position in a car, A display means to display the above-mentioned display pattern data, While reading the display pattern data corresponding to the sheet position chosen by the above-mentioned selection means from the above-mentioned storage means and displaying on the above-mentioned display means Sound equipment for mount equipped with the control means which controls the above-mentioned signal-processing means and adjusts sound signal level and a time delay corresponding to the above-mentioned sheet position.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the sound equipment for mount possessing the display which displays the display used for sound equipments, such as the radio set and cassette deck which are used in the vehicle interior of a room, and a CD player, especially spectral characteristics, an equalizer property, etc.

**[0002]**

**[Description of the Prior Art]** The display which has the display means of the dedication which displays spectral characteristics and an equalizer property conventionally is known. Moreover, the sound equipment for mount possessing the level display which makes many light emitting devices publish conventionally is known.

**[0003]**

**[Problem(s) to be Solved by the Invention]** However, it was what uses a light emitting device and displays the level of an acoustic signal with the above-mentioned conventional sound equipment for mount. The voice level and the time delay from each loudspeaker which were installed in the car were adjusted to the sheet position in the car for which the user in a car asks, sound field were set up, and it was what cannot display the set-up sheet position.

**[0004]** When this invention solves the above-mentioned conventional problem, uses the indicating equipment which displays spectral characteristics or an equalizer property and sets sound field as each sheet position in a car, it aims at offering the sound equipment for mount which can display a sheet position as a display pattern.

**[0005]**

**[Means for Solving the Problem]** In order to solve the above-mentioned trouble, this invention adjusts the signal level and the time delay of a sound signal which are outputted from the loudspeaker arranged in a car corresponding to the above-mentioned sheet position while it chooses each sheet position in a car and displays the display pattern data corresponding to the selected sheet position on a display means.

**[0006]** While being able to set sound field as the sheet position for which it asks by this, the sheet position set up with the indicating equipment can be checked easily.

**[0007]**

**[Embodiment of the Invention]** Two or more loudspeakers by which invention of this invention according to claim 1 is arranged at front and rear, right and left in a car, respectively, A signal-processing means to output the signal which consisted of a multiplier, an adder, a delay machine, etc. and adjusted sound signal level and a time delay to the above-mentioned loudspeaker, respectively, A selection means to choose each sheet position in a car, and a storage means to memorize the display pattern data corresponding to each sheet position in a car, A display means to display the above-mentioned display pattern data, While reading the display pattern data corresponding to the sheet position chosen by the above-mentioned selection means from the above-mentioned storage means and

displaying on the above-mentioned display means Have the control means which controls the above-mentioned signal-processing means and adjusts sound signal level and a time delay corresponding to the above-mentioned sheet position, and while being able to set sound field as the sheet position for which it asks It has an operation that the sheet position set up with the indicating equipment can be checked easily.

[0008] The gestalt of operation of this invention is explained using drawing 1 , drawing 2 , and drawing 3 below.

(Gestalt 1 of operation) Drawing 1 is the block diagram showing the configuration of the sound equipment for mount of the gestalt of operation of this invention. In drawing 1 , 1 is a display, and this display 1 is set up using two or more segments which display an equalizer property, spectral characteristics, etc., performs the operation which displays the sound field in sheet position mode with a pattern Fig. using said segment, and consists of LCD etc.

[0009] 2 is a display-control circuit, and with the directions from a control section 3, this display-control circuit 2 sends out the sheet position status signal according to the sheet location in a car to a display 1, and consists of LCD drivers etc.

[0010] A control section 3 sends out data, such as a multiplication value for generating the sound field according to each sheet position, an aggregate value, and a time delay, to a digital disposal circuit 8, has the operation which performs the output of the pattern data of the sound field in sheet position mode, and display directions in the mode of a sheet position to a display and control section 2, and is constituted from the sheet position mode directed by the control unit 4 by the microcomputer etc.

[0011] By having each selection key of each sheet position in the car chosen by the user, and setting up the sound field of the sheet position of hope, a control unit 4 has the operation which outputs the data of the selected sheet position, and consists of switches etc.

[0012] 12 is the storage section, and corresponding to data, such as a multiplication value for generating the sound field according to each memorized sheet position, an aggregate value, and a delay value, and these data, the pattern data of a mode display of a sheet position are memorized, and the storage section 12 has the operation which outputs the data of the sheet position set up by the control signal from a control section 3, and consists of ROMs etc.

[0013] 5 is a music source and this music source 5 is constituted by KASETTODETSU which reproduces music titles, such as a compact cassette tape and a compact disk (CD), or CD deck.

[0014] 6 is an amplifying circuit which amplifies said sound signal, and is constituted by the operational amplifier etc. 7 is an AD translation circuit, has the function to change an analog signal into a digital signal, and is constituted by AD converter IC etc.

[0015] 8 is a digital disposal circuit. These eight digital disposal circuits In order to generate the sound field according to a sheet position from the right / left sound signal to a loudspeaker voice generation means to generate the loudspeaker signal for mount (a front right loudspeaker, a front left loudspeaker, a back right loudspeaker, back left loudspeaker), and each loudspeaker sound signal By adding multiplication, addition, delay, etc., the voice outputted from each loudspeaker has processing of keeping constant time amount, sound volume, etc. which reach a listener, and consists of DSP-IC etc.

[0016] 9 is a DA translation circuit, has the function to change a digital signal into an analog signal, and is constituted by DA converter IC etc.

[0017] 10 is power amplification, has the function which amplifies the sound signal outputted from the DA translation circuit 9, and consists of power amplification IC etc.

[0018] 11 is the loudspeaker 11 arranged before and after the right and left in a car, respectively, has the function which carries out singing processing of the sound signal from an amplifying circuit 10, and consists of loudspeaker units etc., respectively.

[0019] The actuation is explained about the sound equipment for mount constituted as mentioned above. Drawing 2 is the flow Fig. showing operating state. At a control unit 4, the mode of each sheet position is chosen by assignment of a user, and the mode of the selected sheet position is directed to a control section 3.

[0020] With the indication signal from a control unit 4, a control section 3 inputs the data for generating

the delay value according to the selected sheet position, an aggregate value, a multiplication value, etc. from the storage section 12, and outputs said data to a digital disposal circuit 8. Moreover, a control section 3 inputs the pattern data of the selected sheet position display from the storage section 12, and sends out this pattern data to a display and control section 2.

[0021] A display and control section 2 inputs the pattern data according to the sheet position sent from the control section 3, and outputs a status signal to a display 1.

[0022] Drawing 3 shows the example of a display at the time of setting sound field as each sheet position. Drawing 3 (a) shows the case where drawing 3 (d) sets a sheet position as two rear, when all 4 seats are set as a sheet position, drawing 3 (b) sets a driver seat as a sheet position, and drawing 3 (c) sets a sheet position as two fronts.

[0023] On the other hand, the left / right sound signal outputted from a music source 5 are amplified in an amplifying circuit 6, and an analog signal is changed into it by the digital signal by the AD translation circuit 7, and it is impressed to a digital disposal circuit 8. A digital disposal circuit 8 adds signal processing, such as addition, multiplication, and delay, to each mounted loudspeaker signal from the setting data of the selected sheet position sent from the control section 3 while generating the loudspeaker signal for mount (a front right loudspeaker, a front left loudspeaker, a back right loudspeaker, back left loudspeaker) from the right / left sound signal.

[0024] The signal from the processed digital disposal circuit 8 according to the selected sheet position is changed into an analog signal in the DA translation circuit 9, is amplified in an amplifying circuit 10, and is outputted from a loudspeaker 11. From the loudspeaker 11 arranged at front and rear, right and left in a car, the output controlled by the sound signal level according to the set-up sheet position and the time delay is obtained, and sound field are set as the sheet position according to the display pattern displayed on a control section 3.

[0025] That is, when a driver seat is set as a sheet position, to the loudspeaker which becomes far in distance, sound signal level is made high from a driver seat, a time delay is enlarged to a loudspeaker near in distance, and sound field can be set up as if the driver seat was located in the center position of the loudspeaker of front and rear, right and left.

[0026] Next, the example of a display of the sheet position at the time of using the segment which displays the equalizer of 7x7 etc. is explained using drawing 4 .

[0027] The control signal of Segment 0-6 and width is set to common 0-6 for a vertical control signal using the segment of 7x7 of displays, such as LCD.

[0028] When a sheet position is set as a driver seat, it can recognize being set as the sheet position of a current driver's seat by blinking 50 and blinking 41, 61, and 52 similarly by Segment5 and Common0.

[0029] Furthermore, it can display effectively by turning on each sheet (a passenger seat, back \*\*\*\*, back left seat) that the sheet position is set as the driver's seat in 4 seats.

[0030]

[Effect of the Invention] As mentioned above, while this invention chooses each sheet position in a car and displaying the display pattern data corresponding to the selected sheet position on a display means Adjust the signal level and the time delay of a sound signal which are outputted from the loudspeaker arranged in a car corresponding to the above-mentioned sheet position, and while being able to set sound field as the sheet position for which it asks It has the effectiveness that the sheet position set up with the indicating equipment can be checked easily.

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**TECHNICAL FIELD**

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**PRIOR ART**

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**EFFECT OF THE INVENTION**

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**TECHNICAL PROBLEM**

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**MEANS**

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[Means for Solving the Problem] In order to solve the above-mentioned trouble, this invention adjusts the signal level and the time delay of a sound signal which are outputted from the loudspeaker arranged in a car corresponding to the above-mentioned sheet position while it chooses each sheet position in a car and displays the display pattern data corresponding to the selected sheet position on a display means.

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[0011] By having each selection key of each sheet position in the car chosen by the user, and setting up the sound field of the sheet position of hope, a control unit 4 has the operation which outputs the data of

the selected sheet position, and consists of switches etc.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block diagram of the sound equipment for mount in the gestalt of operation of this invention

[Drawing 2] The flow Fig. showing actuation of the gestalt of this operation

[Drawing 3] The indicator chart showing the example of a sound-volume display in the gestalt of this operation

[Drawing 4] The indicator chart showing the detail of the display in the gestalt of this operation

[Description of Notations]

- 1 Display
- 2 Display-Control Circuit
- 3 Control Section
- 4 Control Unit
- 5 Music Source
- 6 Amplifying Circuit
- 7 AD Translation Circuit
- 8 Digital Disposal Circuit (DSP)
- 9 DA Translation Circuit
- 10 Amplifying Circuit
- 11 Loudspeaker
- 12 Storage Section

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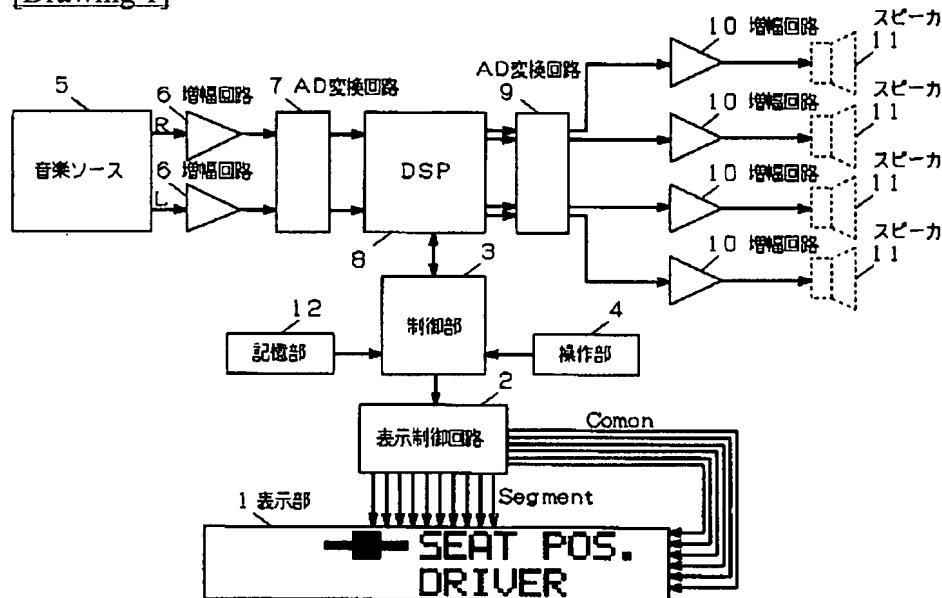
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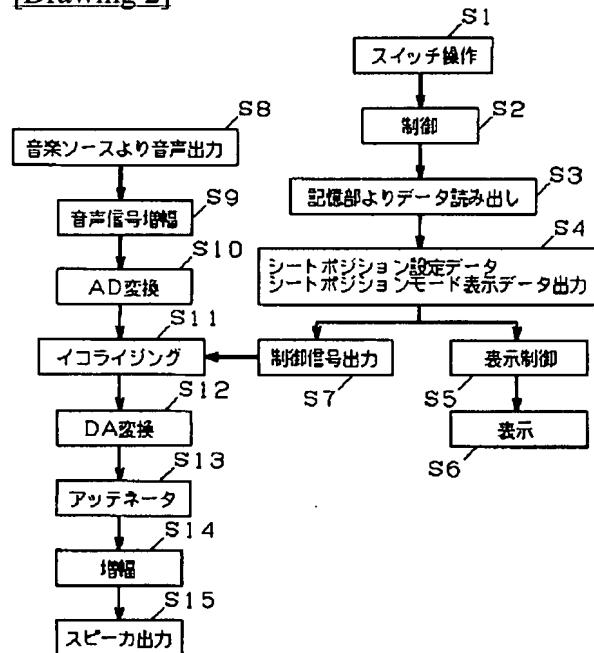
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## DRAWINGS

## [Drawing 1]



## [Drawing 2]



## [Drawing 3]

(a)



(b)



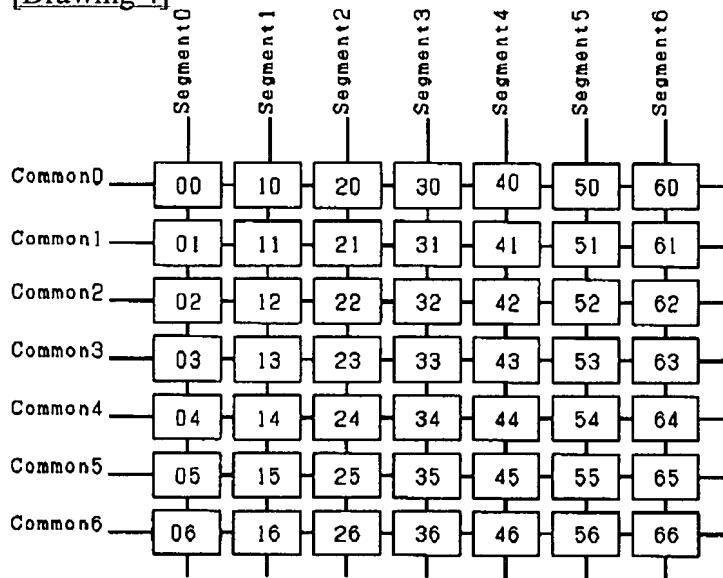
(c)



(d)



## [Drawing 4]



[Translation done.]